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United States
Department of
Agriculture

Soil
Conservation
Service

Montana Basin Outlook Report

May 1, 1993

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MONTANA Water Supply Outlook Report as of May 1, 1993

Most of Montana finally received a couple good storms during April, with the greatest impact being in the Central, Southwestern and Southcentral parts of the state. The upper half of Northwestern and Northcentral Montana still will need above to well above average May and June precipitation to ensure adequate surface water supplies.

SNOWPACK

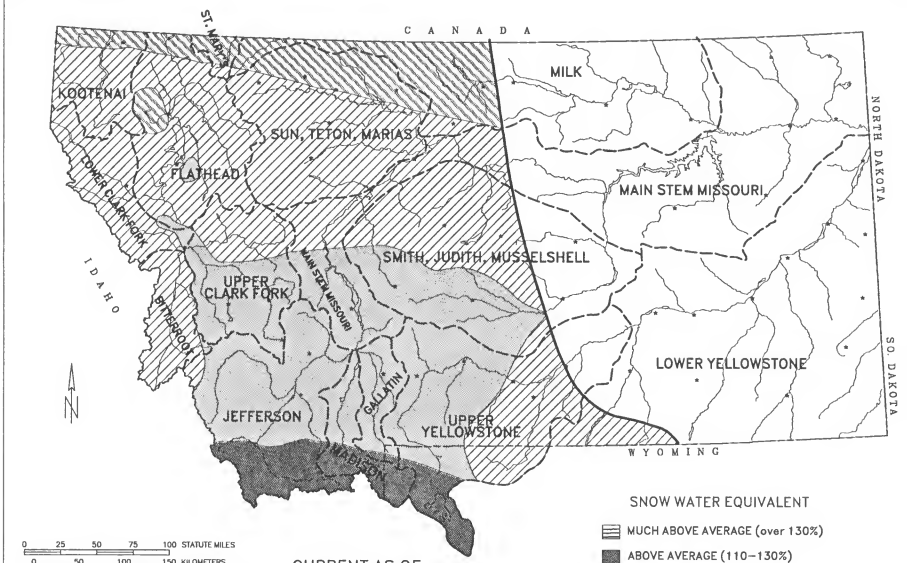
May 1 snow surveys show snowpack percents of average have increased in every major river basin from one month ago, except in the St. Mary and Milk where they decreased 5 percentage points. With these increases, there has been a delay in snowmelt runoff for the seasonal streamflow volumes. The Jefferson River, Madison River, Gallatin River and Upper Yellowstone River Basins have increased 25 to 29 percent from April 1.

The lowest May 1 basin snowpack measurements occurred in the Little Bitterroot-Ashley River Watersheds (Flathead River Basin) at 56 percent of average and the highest occurred in the Upper Madison River Watershed (Madison River Basin) at 120 percent of average.

West of the Continental Divide, snowpacks are below average and 33 to 77 above last year. East of the Continental Divide snowpacks are mostly below to near average, except in the St. Mary and Milk River Basins that are well below average and in the Upper Madison River Basin where it is above average.

RIVER BASIN	% OF AVERAGE	% OF LAST YEAR
KOOTENAI	70	142
FLATHEAD	80	142
UPPER CLARK FORK	85	177
BITTERROOT	76	152
LOWER CLARK FORK	76	133
JEFFERSON	103	166
MADISON	114	217
GALLATIN	105	162
MAINSTEM MISSOURI	82	196
SMITH-JUDITH-MUSSELSHELL	88	172
SUN-TETON-MARIAS	74	195
ST. MARY AND MILK	60	129
UPPER YELLOWSTONE	98	150
LOWER YELLOWSTONE	92	163

MOUNTAIN SNOWWATER EQUIVALENT FOR MONTANA



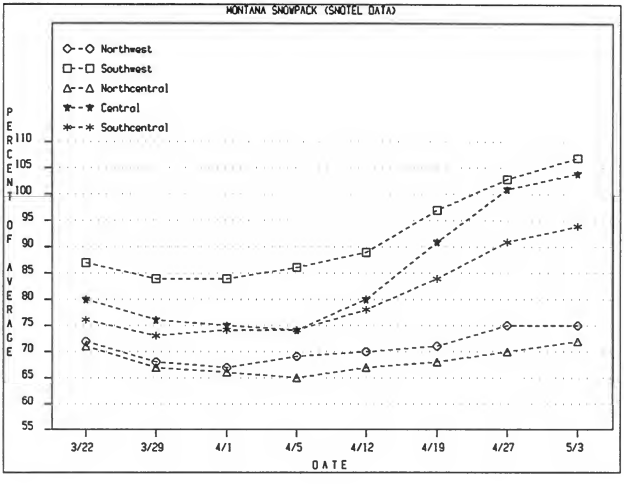
SOURCE
Information provided by SCS Snow Survey Personnel

CURRENT AS OF
MAY 1, 1993

Note:
Data used to generate this map are PROVISIONAL and SUBJECT TO CHANGE. The "Much Above Average" class does not appear in the May report.

SNOW WATER EQUIVALENT

- MUCH ABOVE AVERAGE (over 130%)
- ABOVE AVERAGE (110–130%)
- NEAR AVERAGE (90–110%)
- BELOW AVERAGE (70–90%)
- MUCH BELOW AVERAGE (below 70%)
- NO MOUNTAIN SURVEY
- * SCS Office Locations


MONTANA SNOWPACK (SNOTEL DATA)
Northwest
Southwest
Northcentral
Central
Southcentral
PERCENT OF AVERAGE
110
105
100
95
90
85
80
75
70
65
60
55
3/22
3/29
4/1
4/5
4/12
4/19
4/27
5/3
DATE

PRECIPITATION

April valley precipitation west of the Divide was above average and east of the Divide valley precipitation was well above average.

April mountain precipitation west of the Continental Divide was well below average, except in the Bitterroot where they were average. East of the Continental Divide April ranged from well below to near average. Water year precipitation west of the Continental Divide remains below average and east of the Continental Divide ranges from below average to near average.

RIVER BASIN	APRIL % OF AVERAGE	WATER YEAR % OF AVERAGE
KOOTENAI	124	78
FLATHEAD	138	83
UPPER CLARK FORK	140	86
BITTERROOT	134	83
LOWER CLARK FORK	114	76
JEFFERSON	151	95
MADISON	164	106
GALLATIN	174	100
MAINSTEM MISSOURI	156	93
SMITH-JUDITH-MUSSELSHELL	132	97
SUN-TETON-MARIAS	82	78
St. Mary and Milk	84	82
UPPER YELLOWSTONE	177	95
LOWER YELLOWSTONE	125	90

RESERVOIRS

Reservoir storages remain well below average in the Kootenai, Flathead, Bitterroot, and Gallatin River Basins; below average in the Jefferson River Basin; average in the Upper Clark Fork, Mainstem Missouri, Madison, Milk, and Lower Yellowstone River Basins; above average in the Lower Clark Fork, Smith-Judith-Musselshell, Upper Yellowstone and Sun-Teton-Marias River Basins.

RIVER BASIN	% OF CAPACITY	% OF AVERAGE
KOOTENAI	26	63
FLATHEAD	32	57
UPPER CLARK FORK	77	98
BITTERROOT	37	61
LOWER CLARK FORK	79	126
JEFFERSON	47	70
MADISON	72	107
GALLATIN	27	58
MAINSTEM MISSOURI	77	102
SMITH-JUDITH-MUSSELSHELL	85	117
SUN-TETON-MARIAS	56	113
MILK	57	92
UPPER YELLOWSTONE	52	119
LOWER YELLOWSTONE	58	99

STREAMFLOW

Provisional April streamflow data in the Columbia River Basin generally were below average at around 71 percent and 87 percent of last April; in the Missouri River Basin generally were below average at around 87 percent and 116 percent of last April; and in the Yellowstone River Basin generally were below average at 73 percent and 77 percent of last April.

Assuming current conditions persist, seasonal volume streamflows are forecast to be from well below average in northcentral Montana, to near average in southwest Montana.

RIVER BASIN	FORECASTS % OF AVERAGE	FORECASTS % OF LAST YEAR
KOOTENAI	73	88
FLATHEAD	76	113
UPPER CLARK FORK	61	117
BITTERROOT	64	125
LOWER CLARK FORK	72	127
JEFFERSON	81	126
MADISON	107	143
GALLATIN	98	142
MAINSTEM MISSOURI	84	135
SMITH-JUDITH-MUSSELSHELL	92	231
SUN-TETON-MARIAS	60	113
ST. MARY AND MILK	64	85
UPPER YELLOWSTONE	83	115
LOWER YELLOWSTONE	83	128

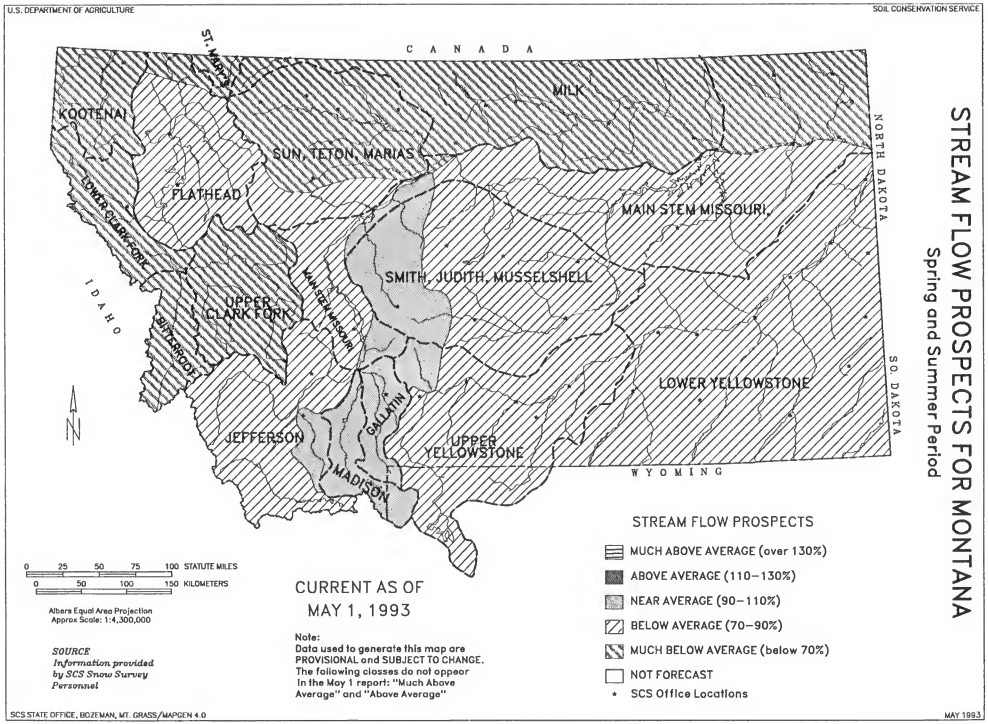
NOTE: The "FORECASTS % OF LAST YEAR" column in the table above, is comparing this seasons forecast volumes with the forecast volumes of last year at this same time. It is not comparing this years forecast volumes with what actually occurred last year.

Streamflow peaks in the Columbia River Basin are estimated to occur during the latter part of May to the first part of June with peak flows being below average; the Missouri River Basin around the first couple weeks in June, with peaks being below average on the low end and near to slightly above average on the high end; and the Yellowstone River Basin from the middle to latter part of June, with peak flows being below average on the low end to near or slightly above average on the high end.

Estimates of peak streamflow volumes for unregulated streams are as follows:

	Peak Day Range in CFS			1961-90 AVG CFS
COLUMBIA RIVER DRAINAGE				
Blackfoot R nr Bonner	3,800	to	6,800	9,072
Clark Fk R ab Missoula	6,400	to	11,300	15,684
Bitterroot R nr Darby	2,800	to	5,000	5,869
Clark Fk R bl Missoula	15,000	to	25,000	30,257
Clark Fk R at St. Regis	18,600	to	30,000	37,923
N Fk Flathead R nr Columbia Falls	10,500	to	17,000	20,478
M Fk Flathead R nr West Glacier	11,800	to	17,400	21,973
MISSOURI RIVER DRAINAGE				
Big Hole R nr Melrose	4,900	to	7,550	7,382
Ruby R ab Reservoir	640	to	1,060	989
Gallatin R nr Gateway	4,500	to	5,700	5,189
Gallatin R nr Logan	4,300	to	6,150	5,314
Missouri R at Toston	15,800	to	23,000	17,864
Marias R nr Shelby	1,700	to	4,000	10,282
S Fk Musselshell R ab Martinsdale	550	to	900	1,229
YELLOWSTONE RIVER DRAINAGE				
Yellowstone R at Corwin Springs	11,200	to	16,500	16,880
Yellowstone R at Livingston	13,000	to	18,700	19,827
Boulder R nr Big Timber	3,800	to	5,600	5,035
Stillwater R nr Absarokee	4,100	to	6,700	6,307
Clarks Fk nr Belfry	5,000	to	7,600	7,466
Yellowstone R at Billings	26,500	to	40,000	40,887

NOTE: The low number in the flow range represents the maximum daily flow that would be expected to occur with little rainfall during the peak snowmelt period. The high number in the flow range could be expected with moderate amounts of rain about the same time as maximum snowmelt runoff is occurring.


U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
STREAM FLOW PROSPECTS FOR MONTANA
Spring and Summer Period
CANADA
ST. MARY'S
KOOTENAI
MILK
SUN, TETON, MARIAS
FLATHEAD
LOWER CLARK FORK
MAIN STEM MISSOURI
NORTH DAKOTA
SMITH, JUDITH, MUSSELSHELL
IDAHO
UPPER CLARK FORK
MAIN STEM MISSOURI
SILVERBOW
LOWER YELLOWSTONE
SO. DAKOTA
GALLATIN
JEFFERSON
UPPER YELLOWSTONE
MADISON
WYOMING
BEAVERHEAD
0 25 50 75 100 STATUTE MILES
0 50 100 150 KILOMETERS
Albers Equal Area Projection
Aprox Scale: 1:4,300,000
SOURCE
Information provided by SCS Snow Survey Personnel
CURRENT AS OF
MAY 1, 1993
Note:
Data used to generate this map are PROVISIONAL and SUBJECT TO CHANGE. The following classes do not appear in the May 1 report: "Much Above Average" and "Above Average"
STREAM FLOW PROSPECTS
MUCH ABOVE AVERAGE (over 130%)
ABOVE AVERAGE (110–130%)
NEAR AVERAGE (90–110%)
BELOW AVERAGE (70–90%)
MUCH BELOW AVERAGE (below 70%)
NOT FORECAST
SCS Office Locations
SCS STATE OFFICE, BOZEMAN, MT. GRASS/MAPGEN 4.0
MAY 1993

SOIL MOISTURE

Fall precipitation and winter streamflows indicated soil moisture conditions in the Kootenai River, Lower Clark Fork River, Bitterroot River and Jefferson River Basins were well below average with all other basins slightly below to near average. Above average low elevation snowpacks and some valley rain have helped the surface soil deficits, but it is unlikely it has been enough to overcome severe deficits.

SURFACE WATER SUPPLY INDEX

The Surface Water Supply Index (SWSI) is a measure of available surface water supplies during the spring and summer months. The index ranges from -4.0 to +4.0. A SWSI of -4.0 represents an extremely dry condition, 0 is a near normal condition and +4.0 represents an extremely wet condition. The SWSI provides a scale to evaluate various levels of wetness or dryness and water supply conditions across the state. The SWSI takes into account snowpack, mountain precipitation, soil moisture and available reservoir storage.

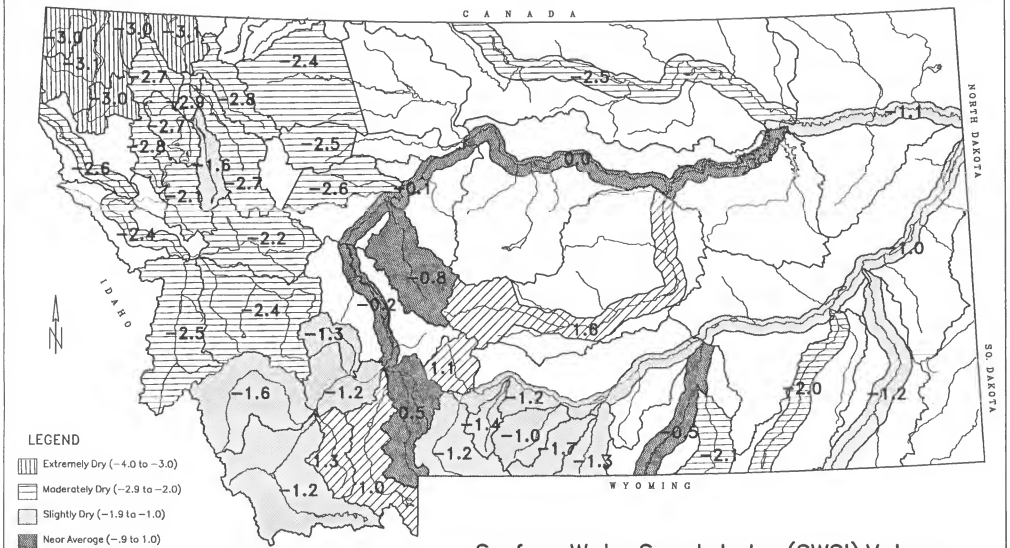
SWSI RATING	SURFACE WATER CONDITION
+3.0 to +4.0	Extremely Wet
+2.0 to +3.0	Moderately Wet
+1.0 to +2.0	Slightly Wet
-1.0 to +1.0	Near Average
-1.0 to -2.0	Slightly Dry
-2.0 to -3.0	Moderately Dry
-3.0 to -4.0	Extremely Dry

SWSI's as of May 1, 1993 for the remainder of the 1993 irrigation season.

SWSI Rating	Basin
-3.2	Kootenai River at Ft. Steele (Kootenai in Canada)
-3.0	Tobacco River
-3.0	Kootenai Ft. Steele to Libby Dam
-3.1	Kootenai River below Libby Dam
-3.0	Fisher River
-3.0	Yaak River
-3.1	North Fork Flathead River
-2.8	Middle FORK Flathead River
-2.7	South Fork Flathead River
-2.9	Flathead River at Columbia Falls
-2.7	Stillwater/Whitefish Rivers
-1.6	Swan River
-2.7	Flathead River at Polson
-2.1	Mission Valley
-2.8	Little Bitterroot River
-2.6	Clark Fork River above Rock Creek
-2.2	Blackfoot River
-2.4	Clark Fork River above Missoula
-2.5	Bitterroot River
-2.4	Clark Fork River below Bitterroot River
-2.6	Clark Fork River below Flathead River
-1.2	Beaverhead River
1.3	Ruby River
-1.6	Big Hole River
-1.3	Boulder River (Jefferson)

SWSI's as of May 1, 1993 for the remainder of the 1993 irrigation season.

SWSI Rating	Basin
-1.2	Jefferson River
1.0	Madison River
0.5	Gallatin River
-0.2	Missouri River above Canyon Ferry
-0.1	Missouri River below Canyon Ferry
-0.8	Smith River
-2.6	Sun River
-2.5	Teton River
-2.8	Birch/Dupuyer Creeks
-2.4	Marias River
1.6	Musselshell River
0.0	Missouri River above Ft. Peck
-1.1	Missouri River below Ft. Peck
-2.5	Milk River (USBR users)
-3.5	Milk River (other users)
-1.2	Yellowstone River above Livingston
1.1	Shields River
-1.4	Boulder River (Yellowstone)
-1.0	Stillwater River
-1.7	Rock/Red Lodge Creeks
-1.3	Clarks Fork River
-1.2	Yellowstone River above Bighorn River
-0.5	Bighorn River below Bighorn Lake
-2.1	Little Bighorn River
-1.0	Yellowstone River below Bighorn River
-2.0	Tongue River
-1.2	Powder River



Surface Water Supply Index (SWSI) Values: May 1, 1993

Note: SWSI values are primarily an indicator of water supply conditions for irrigated lands within each basin. Data used to generate this map are PROVISIONAL and SUBJECT TO CHANGE. The following classes do not appear in the May 1 report: Moderately Wet and Extremely Wet.

KOOTENAI RIVER BASIN in Montana as of May 1, 1993

Snowpack conditions in the Kootenai River Basin increased 1 percent during April and are below average and 42 percent above last year. On May 1 the snow water content was 70 percent of average and 142 percent of last year. The East Kootenai in British Columbia snow water content was 65 percent of average and 7 percent above last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April finally was above average at 124 percent and was 51 percent above last April. Water year precipitation, beginning October 1, 1992, remains below average at 78 percent and is 5 percent above last year.

Lake Koocanusa storage on the last day of April was well below average at 63 percent and 40 percent below last year.
Streamflows are forecast to be below average at 73 percent and 12 percent below those of last year. Provisional April streamflow data at the Fisher River near Libby was about 73 percent of average and 47 percent above last year; the Yaak River near Troy was about 67 percent of average and 13 percent above last year; and the Kootenai below Libby Dam was about 72 percent of average and 32 percent below last year.

Surface Water Supply Index (SWSI) rating for the Kootenai River at Ft. Steele (Kootenai in Canada) was -3.2; the Tobacco River was -3.0; the Kootenai Ft. Steele to Libby Dam was -3.0; the Kootenai River below Libby Dam was -3.1; the Fisher River was -3.0; and the Yaak River was -3.0.

KOOTENAI RIVER BASIN in Montana
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	==========		Chance of Exceeding *		==========		
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
TOBACCO nr Eureka							
MAY-JUL	50	60	66	60	72	82	110
MAY-SEP	58	69	77	62	85	96	124
KOOTENAI bl Libby Dam (1,2)							
MAY-JUL	2870	3520	3820	72	4120	4770	5301
MAY-SEP	3430	4200	4550	72	4900	5670	6294
FISHER nr Libby							
MAY-JUL	80	94	104	64	114	128	163
MAY-SEP	89	104	114	64	124	139	179
YAAK nr Troy							
MAY-JUL	167	205	230	62	255	295	372
MAY-SEP	184	225	250	63	275	315	394

Forecast Pt / Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions — Chance of Exceeding * — 50% (Most Prob) (1000AF)	(% AVG.)	=== Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
KOOTENAI at Leonia (1,2)							
MAY-JUL	3470	4260	4620	74	4980	5770	6223
MAY-SEP	4060	4990	5410	74	5830	6760	7304

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

KOOTENAI RIVER BASIN in Montana
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********** This Year	Last Year	Average
LAKE KOOCANUSA	5748.0	1508.0	2523.0	2409.0

KOOTENAI RIVER BASIN in Montana
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
EAST KOOTENAI in B.C.	24	107	66
KOOTENAI MAINTSTEM in MT	16	142	70
TOBACCO	3	102	61
FISHER	5	156	73
YAAK	7	154	70
KOOTENAI in MT	16	142	70
KOOTENAI ab Bonners Ferry	40	122	68

FLATHEAD RIVER BASIN as of May 1, 1993

Snowpack conditions in the Flathead River Basin are below average, increased 8 percent from one month ago and are 42 percent above last year. Snow water content was 80 percent of average and 142 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation during April was well above average at 138 percent and 46 percent above last April. Water year precipitation, beginning October 1, 1992, is below average at 83 percent and 4 percent above last year.

Reservoir storage on the last day of April was well below average at 57 percent and 43 percent below last year. Combined Camas reservoir storage was 77 percent of average and 40 percent below last year; the combined Mission Valley reservoir storage was 64 percent of average and 2 percent below last year; Hungry Horse storage was 44 percent of average and 57 percent below last year; and Flathead Lake storage was 57 percent of average and 10 percent below last year.

Streamflows are forecast to be below average at 76 percent and 13 percent above those of last year. Provisional April streamflow data for the North Fork Flathead near Columbia Falls was about 89 percent of average and generally 14 percent below last year; the Middle Fork Flathead near West Glacier was about 79 percent of average and 71 percent of last year; and the South Fork Flathead near Columbia Falls was about 77 percent of average and 29 percent below last year.

Estimates of peak streamflow volumes for the North Fork Flathead River near Columbia Falls range from around 10,500 cfs to around 17,000 cfs and the Middle Fork Flathead River near West Glacier range from around 11,800 cfs to around 17,400 cfs. Estimated dates of the peak volumes are from about the middle to latter part of May.

Surface Water Supply Index (SWSI) rating for the North Fork Flathead River was -3.1; the Middle Fork Flathead River was -2.8; the South Fork Flathead River was -2.7; the Flathead River at Columbia Falls was -2.9; the Stillwater/Whitefish Rivers were -2.7; the Swan River was -1.6; the Flathead River at Polson was -2.7; Mission Valley was -2.1; and the Little Bitterroot River was -2.8.

FLATHEAD RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===	Future	Conditions	=== Wetter ===>		
Forecast Pt	Chance of Exceeding *					
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
NF FLATHEAD nr Columbia Falls							
MAY-JUL	940	1030	1090	74	1150	1240	1474
MAY-SEP	1070	1170	1240	75	1310	1410	1648
MF FLATHEAD nr West Glacier							
MAY-JUL	890	1010	1090	75	1170	1290	1454
MAY-SEP	980	1110	1200	75	1290	1420	1604

Forecast Pt / Forecast Period	<--- Drier --- 90% (1000AF)	70% (1000AF)	Future Conditions --- Chance of Exceeding * --- 50% (Most Prob) (1000AF)	(% AVG.)	--- Wetter ---> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
SF FLATHEAD nr Columbia Fls (1,2)							
MAY-JUL	1140	1290	1360	77	1430	1580	1777
MAY-SEP	1220	1410	1490	78	1570	1760	1911
FLATHEAD at Columbia Falls (2)							
MAY-JUL	3150	3460	3670	76	3880	4190	4816
MAY-SEP	3430	3790	4030	76	4270	4630	5294
STILLWATER nr Whitefish							
MAY-JUL	105	116	124	80	132	143	155
MAY-SEP	121	134	143	82	152	165	174
WHITEFISH nr Kalispell							
MAY-JUL	63	70	75	82	80	87	92
MAY-SEP	76	82	87	83	92	98	105
SWAN nr Bigfork							
MAY-JUL	350	385	410	84	435	470	491
MAY-SEP	410	455	485	84	515	560	574
FLATHEAD nr Polson (1,2)							
MAY-JUL	3470	3980	4210	75	4440	4950	5578
MAY-SEP	3700	4340	4630	76	4920	5560	6114

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

FLATHEAD RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********** This Year	Last Year	Average
CAMAS (4)	45.2	21.9	36.3	28.5
MISSION VALLEY (8)	100.0	31.9	32.7	49.7
HUNGRY HORSE	3451.0	900.0	2074.0	2043.0
FLATHEAD LAKE	1791.0	787.0	873.8	937.2

FLATHEAD RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
NORTH FORK FLATHEAD	12	131	74
MIDDLE FORK FLATHEAD	7	152	70
SOUTH FORK FLATHEAD	6	144	87
STILLWATER-WHITEFISH	8	162	79
SWAN	9	137	94
MISSION VALLEY	5	133	94
LITTLE BITTERROOT-ASHLEY	9	738	56
JOCKO	5	122	88
FLATHEAD	42	142	80

UPPER CLARK FORK RIVER BASIN as of May 1, 1993

Snowpack conditions in the Upper Clark Fork River Basin are below average increasing 20 percent from last month and 77 percent above last year. Snow water content was 85 percent of average and 177 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April was well above average at 140 percent and 59 percent above last April. Water year precipitation, beginning October 1, 1992, remains below average at 86 percent and 12 percent above last year.

Reservoir storage on the last day of April was average at 98 percent and 9 percent below last year. Georgetown Lake storage was 109 percent of average and 6 percent below last year; Lower Willow Creek storage was 118 percent of average and 5 percent below last year; and Nevada Creek storage was 64 percent of average and 21 percent below last year.

Streamflows are forecast to be well below average at 61 percent and 17 percent above last year. Provisional April inflow data at Moulton Reservoir was about 71 percent of average; Flint Creek near Southern Cross was about 105 percent of average and 9 percent below last April; Rock Creek near Clinton was about 53 percent of average and about 21 percent below last year; and the Clark Fork River above Missoula was about 65 percent of average and 7 percent below last April.

Estimates of peak streamflow volumes for the Blackfoot near Bonner range from around 3,800 cfs to around 6,800 cfs and the Clark Fork above Missoula range from around 6,400 cfs to around 11,300 cfs. Estimated dates of the peak volumes are from about the latter part of May to the first of June.

Surface Water Supply Index (SWSI) rating for the Clark Fork River above Rock Creek was -2.6; the Blackfoot River was -2.2; and the Clark Fork River above Missoula was -2.4.

UPPER CLARK FORK RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===	Future Conditions	=== Wetter ===>		
Forecast Pt	Chance of Exceeding *				
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF) (% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
MOULTON RES inflow (million gal.)						
MAY-JUN	23	56	78 45	100	133	172
MAY-JUL	27	63	87 45	112	148	195
WARM SPRINGS CK at Anaconda (2)						
MAY-JUL	18.0	24	28 78	32	38	36
MAY-SEP	26	33	37 84	41	48	44
LITTLE BLACKFOOT nr Garrison						
MAY-JUL	21	29	37 54	53	77	69
MAY-SEP	25	34	43 57	60	85	76

Forecast Pt / Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
	<=== Drier ===	Future Conditions	Chance of Exceeding *		=== Wetter ===>		
FLINT CK nr Southern Cross (2)							
MAY-JUL	3.1	4.4	5.6	46	7.5	10.4	12.1
MAY-SEP	3.7	5.0	6.3	43	8.8	12.4	14.7
FLINT CK bl Boulder Ck							
MAY-JUL	18.0	23	28	56	35	45	50
MAY-SEP	27	34	40	61	48	61	66
LOWER WILLOW CK RES inflow							
MAY-JUL	1.9	2.7	3.4	30	5.2	7.8	11.4
MAY-SEP	2.2	3.2	4.1	33	6.0	8.7	12.3
MF ROCK CK nr Philipsburg							
MAY-JUL	26	33	38	61	43	50	62
MAY-SEP	31	39	44	64	49	57	69
ROCK CK nr Clinton							
MAY-JUL	116	146	167	63	188	220	264
MAY-SEP	141	174	196	65	220	250	300
NEVADA CK nr Finn							
MAY-JUL	3.8	5.5	7.0	46	9.8	14.0	15.2
MAY-SEP	5.4	7.1	8.7	51	11.7	16.2	16.9
CLEARWATER nr Clearwater							
MAY-JUL	78	91	100	75	109	122	133
MAY-SEP	78	95	106	75	118	135	142
BLACKFOOT nr Bonner							
MAY-JUL	330	405	455	64	505	580	714
MAY-SEP	395	475	525	65	575	655	805
CLARK FORK ab Milltown							
MAY-JUL	138	250	325	59	400	510	549
MAY-SEP	196	315	400	61	485	605	652
CLARK FORK ab Missoula							
MAY-JUL	500	665	780	62	895	1060	1263
MAY-SEP	630	805	925	63	1050	1220	1457

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

UPPER CLARK FORK RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********* This Year	Last Year	Average
GEORGETOWN LAKE	31.0	27.1	28.7	24.9
LOWER WILLOW CREEK	4.9	3.9	4.1	3.3
NEVADA CREEK	12.6	6.5	8.2	10.2

UPPER CLARK FORK RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
CLARK FORK ab FLINT CREEK	13	194	97
FLINT CREEK	7	260	91
ROCK CREEK	5	162	91
CLARK FORK ab BLACKFOOT	22	203	94
BLACKFOOT	11	144	78
UPPER CLARK FORK	30	176	87

BITTERROOT RIVER BASIN as of May 1, 1993

Snowpack conditions in the Bitterroot River Basin remain below average, increased 9 percent from April 1 and are 52 percent above last year. Snow water content was 76 percent of average and 152 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April was well above average at 134 percent and 6 percent below last April. Water year precipitation, beginning October 1, 1992, remains below average at 83 percent and 3 percent below last year.

Reservoir storage on the last day of April was 61 percent of average and 55 percent below last year. Painted Rocks Lake storage was 58 percent of average and 44 percent below last year and Como storage was 64 percent of average (Como Lake was drained to rework the dam) and 24 percent below last year.

Streamflows are forecast to be well below average at 64 percent and 25 percent above last year. Provisional April streamflow data for the Bitterroot near Darby was about 55 percent of average and about 31 percent below last year; Rock Creek Como inflow to Darby was about 65 percent of average; and the Bitterroot at Missoula was about 90 to 70 percent of average and about 27 percent below last year.

Estimates of peak streamflow volumes for the Bitterroot near Darby range from around 2,800 cfs to around 5,000 cfs. Estimated dates of the peak volumes are from about mid to the latter part of May.

Surface Water Supply Index (SWSI) rating for the Bitterroot River was -2.5.

BITTERROOT RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	========== Chance of Exceeding * ==========						
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
WF BITTERROOT nr Conner (2)							
MAY-JUL	44	61	73	54	85	102	134
MAY-SEP	50	68	80	54	92	111	148
BITTERROOT nr Darby							
MAY-JUL	170	225	260	60	295	350	435
MAY-SEP	210	265	300	62	335	390	484
ROCK CK nr Darby (2)							
MAY-JUL	37	43	47	68	51	57	69
MAY-SEP	39	45	49	67	53	60	73
SKALKAHO CK nr Hamilton							
MAY-JUL	22	27	30	70	33	38	43
MAY-SEP	27	32	36	72	40	45	50
BURNT FORK CK nr Stevensville (2)							
MAY-JUL	11.0	15.0	18.0	67	21	25	27
MAY-SEP	15.0	20	23	72	26	31	32

Forecast Pt / Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions === Chance of Exceeding * 50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	Wetter ===> 10% (1000AF)	30 Yr Avg (1000AF)
BITTERROOT at Missoula							
MAY-JUL	565	680	755	66	830	945	1149
MAY-SEP	645	765	845	67	925	1050	1266

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

BITTERROOT RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********** This Year	Last Year	Average
PAINTED ROCKS LAKE	31.7	11.5	20.5	20.0
COMO	34.9	13.0	17.1	20.2

BITTERROOT RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
WEST FORK BITTERROOT	3	187	81
EAST SIDE BITTERROOT	4	160	84
WEST SIDE BITTERROOT	4	134	71
BITTERROOT	11	152	76

LOWER CLARK FORK RIVER BASIN as of May 1, 1993

Snowpack conditions in the Lower Clark Fork River Basin remain below average, increased 5 percent from April 1 and 33 percent above last year. Snow water content was 76 percent of average and 133 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation during April was above average at 114 percent and 2 percent below last April. Water year precipitation, beginning October 1, 1992, was below average at 76 percent and 6 percent below last year. Noxon Rapids storage on the last day of April was 126 percent of average and 3 percent below last year.

Streamflows are forecast to be below average at 72 percent and 27 percent above last year. Provisional April streamflow data for the Clark Fork River below Missoula was 67 percent of average and about 16 percent below last year; the Clark Fork River at St. Regis was about 67 percent of average and 14 percent below last year.

Estimates of peak streamflow volumes for the Clark Fork below Missoula range from around 15,000 cfs to around 25,000 cfs and for the Clark Fork at St. Regis range from around 18,600 cfs to around 30,000 cfs. Estimated dates of the peak volumes are from about the latter part of May to about the first of June.

Surface Water Supply Index (SWSI) rating for the Clark Fork River below Bitterroot River was -2.4 and the Clark Fork River below Flathead River was -2.6.

LOWER CLARK FORK RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	========== Chance of Exceeding * ==========						
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
CLARK FORK ab Missoula							
MAY-JUL	500	665	780	62	895	1060	1263
MAY-SEP	630	805	925	63	1050	1220	1457
CLARK FORK bl Missoula							
MAY-JUL	1130	1390	1570	65	1750	2010	2413
MAY-SEP	1300	1580	1770	65	1960	2240	2724
CLARK FORK at St. Regis (1)							
MAY-JUL	1350	1830	2050	65	2270	2750	3152
MAY-SEP	1530	2070	2320	65	2570	3110	3561
CLARK FORK nr Plains (1,2)							
MAY-JUL	4780	5830	6300	70	6770	7820	9052
MAY-SEP	5340	6500	7030	70	7560	8720	10080
THOMPSON RIVER nr Thompson Falls							
MAY-JUL	68	89	104	62	119	140	169
MAY-SEP	86	110	126	64	142	166	196

Forecast Pt / Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions 50% (Most Prob) (1000AF) (% AVG.)	=== Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
	Chance of Exceeding *					
PROSPECT CREEK at Thompson Falls						
MAY-JUL	44	53	59	63	65	74	94
MAY-SEP	50	60	66	64	72	82	103
CLARK FK at Whitehorse Rpds (1,2)						
MAY-JUL	5420	6660	7230	72	7800	9040	10020
MAY-SEP	6050	7440	8070	72	8700	10100	11200

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

LOWER CLARK FORK RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********** This Year	Last Year	Average
NOXON RAPIDS	335.0	263.5	272.0	208.7

LOWER CLARK FORK RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
UPPER CLARK FORK	30	176	87
BITTERROOT	11	152	76
LOWER CLARK FORK	13	133	76
CLARK FORK TOTAL	50	157	81
FLATHEAD	42	142	80
PEND OREILLE	87	152	80

JEFFERSON RIVER BASIN as of May 1, 1993

Snowpack conditions in the Jefferson River Basin are average, increased 28 percent from last month and are 66 percent above last year. Snow water content was 103 percent of average and 166 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April was well above average at 151 percent and 81 percent above last April. Water year precipitation, beginning October 1, 1992, is average at 95 percent and 17 percent above last year.

Reservoir storage on the last day of April was 70 percent of average and 16 percent below last year. Lima storage was 71 percent of average and 3 percent below last year; Clark Canyon storage was 64 percent of average and 22 percent below last year; and Ruby River storage was 96 percent of average and 7 percent below last year.

Streamflows are forecast to be below average at 81 percent and 27 percent above last year. Provisional April streamflow data for the Beaverhead River near Grant was around 112 percent of average and about 32 percent above last year; the Big Hole near Melrose was about 67 percent of average and around 3 percent above last year.

Estimates of peak streamflow volumes for the Big Hole River near Melrose range from around 4,900 cfs to around 7,550 cfs and for the Ruby River above Ruby Reservoir range from around 640 cfs to around 1,060 cfs. Estimated dates of the peak volumes are about the first ten days of June.

Surface Water Supply Index (SWSI) rating for the Jefferson River was -1.2; the Beaverhead River was -1.2; the Ruby River was 1.3; the Big Hole River was -1.6; and the Boulder River was -1.3.

JEFFERSON RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	========== Chance of Exceeding * ==========						
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
RED ROCK RIVER near Monida (2)							
MAY-JUL	39	52	61	85	70	83	72
MAY-SEP	42	57	67	84	77	93	80
BEAVERHEAD RIVER near GRANT (2)							
MAY-JUL	24	58	81	88	104	138	92
MAY-SEP	33	74	102	89	130	171	115
BEAVERHEAD RIVER at Barretts (2)							
MAY-JUL	53	88	112	90	136	171	124
MAY-SEP	75	114	140	90	166	205	155
RUBY RIVER near Alder							
MAY-JUL	46	59	67	92	75	88	73
MAY-SEP	58	74	84	94	94	110	89

Forecast Pt / Forecast Period	<--- Drier --- 90% (1000AF)	70% (1000AF)	Future Conditions 50% (Most Prob) (1000AF)	(% AVG.)	--- Wetter ---> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
	Chance of Exceeding *						
BIG HOLE RIVER near Melrose							
MAY-JUL	305	385	440	79	495	575	555
MAY-SEP	340	430	490	80	550	640	612
BOULDER RIVER near Boulder							
MAY-JUL	28	46	58	77	70	88	75
MAY-SEP	32	52	65	80	79	99	81
WILLOW CREEK near Harrison							
MAY-JUL	3.6	8.5	11.8	78	15.1	20	15.1
MAY-SEP	4.6	10.1	13.8	79	17.5	23	17.4
JEFFERSON RIVER near Three Forks							
MAY-JUL	170	415	585	78	755	1000	749
MAY-SEP	240	505	685	81	865	1130	841

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

JEFFERSON RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********* This Year	Last Year	Average
LIMA	84.0	39.0	40.2	55.1
CLARK CANYON	255.6	104.6	134.9	162.4
RUBY RIVER	38.8	34.8	37.3	36.3

JEFFERSON RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
BEAVERHEAD	15	179	114
RUBY	9	149	102
BIGHOLE	13	132	91
BOULDER	7	240	101
JEFFERSON	35	166	103

MADISON RIVER BASIN as of May 1, 1993

Snowpack conditions in the Madison River Basin are above average, increased 25 percent from April 1 and are 117 percent higher than last year. Snow water content was 114 percent of average and 217 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation during April was well above average at 164 percent and 16 percent above last April. Water year precipitation, beginning October 1, 1992, is average at 106 percent and 28 percent above last year.

Reservoir storage on the last day of April was 107 percent of average and 5 percent below last year. Ennis Lake storage was 102 percent of average and 9 percent above last year and Hebgen Lake storage was 107 percent of average and 7 percent below last year.

Streamflows are forecast to be near average at 107 percent and 43 percent above last year. Provisional April streamflow data at the Madison River near Grayling was 96 percent of average and 26 percent below last year and the Madison River near McAllister was near 75 percent of average and about 31 percent below last year.

Surface Water Supply Index (SWSI) rating for the Madison River was 1.0.

MADISON RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<--- Drier ---		Future Conditions		--- Wetter --->		
Forecast Pt	Chance of Exceeding *						
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
MADISON RIVER near Grayling							
MAY-JUL	305	330	350	109	370	395	321
MAY-SEP	400	435	460	107	485	520	428
MADISON RIVER near McAllister							
MAY-JUL	505	560	595	106	630	685	562
MAY-SEP	670	730	770	105	810	870	731

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

MADISON RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********* This Year	Last Year	Average
ENNIS LAKE	41.0	35.7	32.8	35.1
HEBGEN LAKE	377.5	264.0	283.4	246.1

MADISON RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
MADISON above HEBGEN	6	250	122
LOWER MADISON	10	194	109
MADISON	16	217	115

GALLATIN RIVER BASIN as of May 1, 1993

Snowpack conditions in the Gallatin River Basin are average, increasing 28 percent from last month, and are 62 percent above last year. Snow water content was 105 percent of average and 162 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation during April was well above average at 174 percent and 16 percent above last April. Water year precipitation, beginning October 1, 1992, was average at 100 percent and 18 percent above last year.

Middle Creek storage on the last day of April was 58 percent of average and 28 percent below last year. Note: Middle Creek storage was increased by 2,200 acre-feet during the fall of 1992, therefore the percent of average is reflecting the new capacity with averages prior to the additional storage.

Streamflows are forecast to be near average at 98 percent and 42 percent above last year. Provisional April streamflow data for the Gallatin River near Gateway was around 73 percent of average and about 40 percent below last year and the Gallatin River at Logan was around 83 percent of average and about 15 percent above last year.

Estimates of peak streamflow volumes for the Gallatin River near Gallatin Gateway range from around 4,500 cfs to around 5,700 cfs and for the Gallatin River near Logan range form around 4,300 cfs to around 6,150 cfs. Estimated dates of the peak volumes are from about the first to middle part of June.

Surface Water Supply Index (SWSI) rating for the Gallatin River was 0.5.

GALLATIN RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	Chance of Exceeding *						
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
GALLATIN RIVER near Gateway							
MAY-JUL	355	390	415	101	440	475	409
MAY-SEP	430	470	495	102	520	560	486
E & W FK HYALITE CREEK near Bozeman							
MAY-JUL	15.8	17.8	19.1	91	20	22	21
MAY-SEP	19.5	22	23	92	24	27	25
HYALITE CREEK near Bozeman							
MAY-JUL	25	29	31	94	34	37	33
MAY-SEP	30	34	37	95	40	44	39

Forecast Pt / Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions === Chance of Exceeding * 50% (Most Prob) (1000AF)	50% (% AVG.)	Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
GALLATIN RIVER at Logan							
MAY-JUL	290	360	410	96	460	530	429
MAY-SEP	380	455	505	99	555	630	512

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

GALLATIN RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********* Usable Storage ********* This Year	Last Year	Average
MIDDLE CREEK	10.2	2.8	3.9	4.8

GALLATIN RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
UPPER GALLATIN	9	158	105
EAST GALLATIN	5	154	101
GALLATIN	12	162	105

MAINSTEM MISSOURI RIVER BASIN as of May 1, 1993

Snowpack conditions in the Mainstem Missouri River Basin remain below average, increased 11 percent from April 1, and are 96 percent above last year. Snow water content was 82 percent of average and 196 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation during April was well above average at 156 percent and 75 percent above last April. Water year precipitation, beginning October 1, 1992, is average at 93 percent and 22 percent above last year.

Reservoir storage on the last day of April was 102 percent of average and 4 percent above last year. Canyon Ferry Lake storage was 102 percent of average and 5 percent above last year; Helena Valley storage was 111 percent of average and 3 percent below last year; Lake Helena storage was 108 percent of average and the same as last year; Hauser & Helena storage was 104 percent of average and the same as last year; Holter Lake storage was 110 percent of average and the same as last year; and Fort Peck Lake storage was 102 percent of average and 6 percent below last year.

Streamflows are forecast to be below average at 84 percent and 35 percent above last year. Provisional April streamflow data for the Missouri River near Toston was around 76 percent of average and about 6 percent above last April; the Missouri River at Fort Benton was around 92 percent of average and about 59 percent above last April; and the Missouri River below Fort Peck was around 71 percent of average and 27 percent above last April.

Estimates of peak streamflow volumes for the Missouri River near Toston range from around 15,800 cfs to around 23,000 cfs. Estimated dates of the peak volumes are from about the first to middle of June.

Surface Water Supply Index (SWSI) rating for the Missouri River above Canyon Ferry was -0.2; the Missouri River below Canyon Ferry was -0.1; the Missouri River above Ft. Peck was 0.0; and the Missouri River below Ft. Peck was -1.1.

MAINSTEM MISSOURI RIVER BASIN
Streamflow Forecasts - May 1, 1993

Forecast Pt / Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions — Chance of Exceeding * — 50% (Most Prob) (1000AF)	50% (Most Prob) (% AVG.)	=== Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
MISSOURI RIVER at Toston							
MAY-JUL	1280	1420	1700	98	1980	2180	1730
MAY-SEP	1530	1760	2070	100	2380	2610	2071
PRICKLY PEAR CREEK near Clancy							
MAY-JUL	3.0	10.9	16.2	81	22	29	20
MAY-SEP	5.0	14.0	20	83	26	35	24
SUN RIVER at Gibson Dam							
MAY-JUL	235	285	320	73	355	405	441
MAY-SEP	275	330	365	75	400	455	489

Forecast Pt / Period	<-- Drier -- Future Conditions -- Wetter --> Chance of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
MISSOURI RIVER at Fort Benton							
MAY-JUL	1640	1900	2380	92	2860	3190	2597
MAY-SEP	2010	2440	2960	93	3480	3920	3188
MARIAS RIVER near Shelby							
MAY-JUL	56	122	166	43	210	275	387
MAY-SEP	77	142	186	43	230	295	428
MISSOURI RIVER at Virgelle							
MAY-JUL	1730	2000	2520	83	3040	3450	3030
MAY-SEP	2080	2510	3100	85	3690	4160	3652
MISSOURI RIVER near Landusky							
MAY-JUL	1900	2260	2790	85	3320	3840	3279
MAY-SEP	2300	2840	3420	86	4000	4640	3962
MISSOURI RIVER below Fort Peck							
MAY-JUL	1800	2110	2730	82	3350	3860	3327
MAY-SEP	2040	2610	3280	87	3950	4390	3781
LAKE SAKAKAWEA Inflow (2)							
MAY-JUL	5040	5820	7120	82	8420	9720	8681
MAY-SEP	5600	6740	8100	84	9460	10800	9658

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

MAINSTEM MISSOURI RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********* Usable Storage ********* This Year	Last Year	Average
CANYON FERRY LAKE	2043.0	1535.0	1466.0	1501.0
HELENA VALLEY	9.2	8.3	8.6	7.5
LAKE HELENA	10.4	10.9	10.9	10.1
HAUSER & HELENA	61.9	63.1	63.1	60.4
HOLTER LAKE	81.9	81.4	81.2	73.9
FORT PECK LAKE (MAF)	18.9	10.8	11.5	15.0

MAINSTEM MISSOURI RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
MISSOURI HEADWATERS	57	178	107
WEST SIDE MISSOURI	7	322	106
SMITH-BELT	6	180	102
MAINSTEM MISSOURI	13	223	104
SUN-TETON-MARIAS	14	195	74
JUDITH-MUSSELSHELL	9	166	82
MISSOURI above FORT PECK	86	183	99
MILK RIVER	13	134	60
MISSOURI in MONTANA	96	175	94
MISSOURI blw YELLOWSTONE	165	168	94

SMITH-JUDITH-MUSSELSHELL RIVER BASINS as of May 1, 1993

Snowpack conditions in the Smith-Judith-Musselshell River Basins are average, increased 15 percent from April 1 and are 72 percent above last year. Snow water content was 88 percent of average and 172 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation during April was well above average at 132 percent and 7 percent below last April. Water year precipitation, beginning October 1, 1992, remains average at 97 percent and is 15 percent above last year.

Reservoir storage on the last day of April was 117 percent of average and 4 percent above last year. Smith River storage was 73 percent of average and 8 percent above last year; Newlan storage was 110 percent of average and 11 percent below last year; Bair storage was 107 percent of average and 2 percent below last year; Martinsdale storage was 92 percent of average and 15 percent above last year; and Deadman's Basin was 133 percent of average and 5 percent above last year.

Streamflows are forecast to be near average at 92 percent and 131 percent above last year. Provisional April streamflow data for the Smith River near Fort Logan were around 88 percent of average and about 70 percent above last April.

Estimates of peak streamflow volumes for the South Fork Musselshell above Martinsdale range from around 550 cfs to around 900 cfs.

Surface Water Supply Index (SWSI) rating for the Smith River was -0.8 and the Musselshell River was 1.6.

SMITH-JUDITH-MUSSELSHELL RIVER BASINS
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	Chance of Exceeding *						
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
SMITH RIVER near Fort Logan							
MAY-JUL	24	39	50	94	61	76	53
MAY-SEP	35	51	62	97	73	89	64
SHEEP CREEK nr White Sulphur Springs							
MAY-JUL	11.9	13.9	15.3	94	16.7	18.7	16.3
MAY-SEP	14.4	16.6	18.1	94	19.6	22	19.2
NF MUSSELSHELL near Delpine							
MAY-JUL	1.9	2.9	3.5	92	4.1	5.1	3.8
MAY-SEP	2.5	3.6	4.3	93	5.0	6.1	4.6

Forecast Pt Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions Chance of Exceeding * 50% (Most Prob) (1000AF)	(% AVG.)	=== Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
SF MUSSELSHELL abv Martinsdale							
MAY-JUL	14.0	30	41	89	52	68	46
MAY-SEP	16.0	33	44	88	55	72	50

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

SMITH-JUDITH-MUSSELSHELL RIVER BASINS
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********* Usable Storage ********* This Year	Last Year	Average
SMITH RIVER	10.6	6.6	6.1	9.1
NEWLAN CREEK	12.4	9.7	10.9	8.8
BAIR	7.0	6.2	6.3	5.8
MARTINSDALE	23.1	11.4	9.9	12.4
DEADMAN'S BASIN	72.2	72.2	68.6	54.4

SMITH-JUDITH-MUSSELSHELL RIVER BASINS
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
SMITH-BELT	6	180	102
JUDITH-MUSSELSHELL	9	166	82

SUN-TETON-MARIAS RIVER BASINS as of May 1, 1993

Snowpack conditions in the Sun-Teton-Marias River Basins remain below average, increased 4 percent from April 1, and are 95 percent above last year. Snow water content was 74 percent of average and 195 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April was below average at 82 percent and 4 percent below last April. Water year precipitation, beginning October 1, 1992, remains below average at 78 percent and 3 percent above last year.

Reservoir storage on the last day of April was 113 percent of average and 3 percent above last year. Gibson storage was 115 percent of average and 3 percent above last year; Pishkun storage was 73 percent of average and 32 percent below last year; Willow Creek storage was 97 percent of average and 20 percent below last year; Lower Two Medicine Lake storage was 135 percent of average and 2 percent below last year; Four Horns Lake storage was 107 percent of average and 5 percent above last year; Swift storage was 98 percent of average and 12 percent below last year; Lake Frances storage was 60 percent of average and 45 percent below last year; and Lake Elwell (Tiber) storage was 123 percent of average and 12 percent above last year.

Streamflows are forecast to be well below average at 60 percent and 13 percent above last year. Provisional April streamflow data for the Sun River at Gibson Dam was around 79 percent of average and about 39 percent below last year and the Marias River near Shelby was around 93 percent of average and about 28 percent above last April.

Estimates of peak streamflow volumes for the Marias River near Shelby range from around 1,700 cfs to around 4,000 cfs.

Surface Water Supply Index (SWSI) rating for the Sun River was -2.6; the Teton River was -2.5; the Marias River was -2.4; and the Birch/Dupuyer Creeks were -2.8.

SUN-TETON-MARIAS RIVER BASINS
Streamflow Forecasts - May 1, 1993

	<=== Drier ===	Future	Conditions	=== Wetter ===>		
Forecast Pt	Chance of Exceeding *					
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
SUN RIVER at Gibson Dam							
MAY-JUL	235	285	320	73	355	405	441
MAY-SEP	275	330	365	75	400	455	489
TWO MEDICINE RIVER near Browning							
MAY-JUL	52	89	114	61	139	176	187
MAY-SEP	64	101	126	63	151	188	200
BADGER CREEK near Browning							
MAY-JUL	34	49	59	63	69	85	93
MAY-SEP	45	61	72	65	83	99	110

Forecast Pt / Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions 50% (Most Prob) (1000AF)	(% AVG.)	=== Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
	Chance of Exceeding *						
SWIFT RESERVOIR Inflow near Dupuyer							
MAY-JUL	23	35	43	70	51	63	61
MAY-SEP	33	46	54	74	62	75	73
DUPUYER CREEK near Valier							
MAY-JUL	6.0	7.5	8.9	68	14.0	22	13.1
MAY-SEP	7.3	9.0	10.7	71	16.0	24	15.0
CUT BANK CREEK at Cut Bank							
MAY-JUL	33	43	49	65	55	65	75
MAY-SEP	39	49	56	67	63	73	84
MARIAS RIVER near Shelby							
MAY-JUL	56	122	166	43	210	275	387
MAY-SEP	77	142	186	43	230	295	428

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

SUN-TETON-MARIAS RIVER BASINS
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********* This Year	Last Year	Average
GIBSON	99.1	65.5	63.4	57.2
PISHKUN	32.0	18.5	27.3	25.4
WILLOW CREEK	32.2	23.8	29.8	24.6
LOWER TWO MEDICINE LAKE	11.9	12.0	12.3	8.9
FOUR HORNS LAKE	19.2	13.7	13.1	12.8
SWIFT	30.0	18.0	20.4	18.3
LAKE FRANCES	112.0	46.9	85.5	77.6
LAKE ELWELL (TIBER)	1347.0	749.8	669.1	611.4

SUN-TETON-MARIAS RIVER BASINS
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
SUN-TETON	9	220	74
MARIAS	6	177	72
SUN-TETON-MARIAS	14	195	74

ST. MARY and MILK RIVER BASINS as of May 1, 1993

Snowpack conditions in the St. Mary and Milk River Basins remain below average, dropping 5 percent from April 1, and are 29 percent above last year. Snow water content was 60 percent of average and 129 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April was below average at 84 percent and 5 percent below last April. Water year precipitation, beginning October 1, 1992, remains below average at 82 percent and 4 percent above last year.

Reservoir storage on the last day of April was 92 percent of average and 13 percent above last year. Lake Sherburne storage was 91 percent of average and 153 percent above last year; Fresno storage was 91 percent of average and 5 percent above last year; Beaver Creek storage was 136 percent of average and 3 percent above last year; and Nelson storage was 93 percent of average and 2 percent above last year.

Streamflows are forecast to be well below average at 64 percent and 15 percent below last year.

Surface Water Supply Index (SWSI) rating for the Milk River (USBR) users was -2.5 and the Milk River (other users) was -3.5.

ST. MARY and MILK RIVER BASINS
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	Chance of Exceeding *						
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
SWIFTCURRENT CREEK at Sherburne							
MAY-JUL	60	64	67	68	70	74	98
MAY-SEP	73	79	83	72	87	93	115
ST. MARY RIVER near Babb							
MAY-JUL	210	225	240	65	255	270	371
MAY-SEP	260	285	305	69	325	350	439
MILK RIVER at Eastern Crossing							
MAY-SEP	91	114	136	69	177	215	197
MILK RIVER at Eastern Crossing (2)							
MAY-SEP	13.0	17.0	21	49	28	32	43

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

ST. MARY and MILK RIVER BASINS
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********** This Year	Last Year	Average
LAKE SHERBURNE	64.3	19.0	7.5	20.8
FRESNO	127.0	87.4	83.0	95.8
BEAVER CREEK	3.5	3.4	3.3	2.5
NELSON	66.8	39.5	38.8	42.7

ST. MARY and MILK RIVER BASINS
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
MILK HEADWATERS	8	132	60
BEAR PAW	5	0	41
MILK RIVER	13	134	60
ST. MARY	10	128	61
ST. MARY and MILK	15	129	60
BOW RIVER in ALBERTA	15	98	69
OLDMAN RIVER in ALBERTA	5	236	91

UPPER YELLOWSTONE RIVER BASIN as of May 1, 1993

Snowpack conditions in the Upper Yellowstone River Basin are average, increasing 29 percent from April 1, and are 50 percent above last year. Snow water content was 98 percent of average and 150 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April was well above average at 177 percent and 17 percent above last April. Water year precipitation, beginning October 1, 1992, average at 95 percent and 9 percent above last year.

Reservoir storage on the last day of April was 119 percent of average and 4 percent above last year. Mystic Lake storage was 11 percent of average and 83 percent below last year and Cooney storage was 130 percent of average and 8 percent above last year.

Streamflows are forecast to be below average at 83 percent and 15 percent above last year. Provisional April streamflow data for the Yellowstone River at Corwin was about 89 percent of average and about 51 percent below last year; the Boulder River at Big Timber was about 67 percent of average and around 13 percent above last year; West Rosebud Creek near Roscoe was about 62 percent of average and around 55 percent of last April; the Stillwater near Absarokee was about 81 percent of average and around 32 percent below last April; the Clark's Fork River near Belfry was around 88 percent of average and around 50 percent below last year; and the Yellowstone River near Billings was around 69 percent of average and about 37 percent below last April.

Estimates of peak streamflow volumes for the Yellowstone River at Corwin Springs range from around 11,200 cfs to around 16,500 cfs; the Yellowstone River at Livingston from around 13,000 cfs to around 18,700 cfs; the Boulder River near Big Timber from around 3,800 cfs to around 5,600 cfs; the Stillwater River near Absarokee from around 4,100 cfs to around 6,700 cfs; and the Clarks Fork River near Belfry from around 5,000 cfs to around 7,600 cfs; and the Yellowstone River at Billings range from around 26,000 cfs to around 40,000 cfs. Estimated dates of the peak volumes are for around the middle of June.

Surface Water Supply Index (SWSI) rating for the Yellowstone River above Bighorn River was -1.2; the Yellowstone River above Livingston was -1.2; the Shields River was 1.1; the Boulder River was -1.4; the Stillwater River was -1.0; the Rock/Red Lodge Creeks were -1.7; and the Clarks Fork River was -1.3.

UPPER YELLOWSTONE RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===		Future Conditions		=== Wetter ===>		
Forecast Pt	==========		Chance of Exceeding *		==========		
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
YELLOWSTONE at Lake Outlet							
MAY-JUL	355	405	440	82	475	525	538
MAY-SEP	520	580	620	82	660	720	756

Forecast Pt / Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions — Chance of Exceeding * — 50% (Most Prob) (1000AF)	(% AVG.)	=== Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
YELLOWSTONE RIVER at Corwin Springs							
MAY-JUL	1110	1190	1250	82	1310	1390	1516
MAY-SEP	1340	1440	1510	82	1580	1680	1844
YELLOWSTONE RIVER near Livingston							
MAY-JUL	1230	1340	1420	82	1500	1610	1737
MAY-SEP	1500	1640	1730	81	1820	1960	2123
SHIELDS RIVER near Livingston							
MAY-JUL	91	115	131	98	147	171	134
MAY-SEP	107	131	148	98	165	189	151
BOULDER RIVER at Big Timber							
MAY-JUL	225	260	280	87	305	335	322
MAY-SEP	250	285	310	89	335	370	350
WEST ROSEBUD CREEK near Roscoe							
MAY-JUL	42	48	52	87	56	62	60
MAY-SEP	57	64	68	88	73	79	77
STILLWATER RIVER nr Absarokee							
MAY-JUL	300	365	405	85	450	510	474
MAY-SEP	380	445	485	85	525	590	569
CLARKS FORK RIVER near Belfry							
MAY-JUL	345	390	420	83	450	495	508
MAY-SEP	385	435	465	82	495	545	566
RED LODGE CREEK blw Cooney Res							
MAY-JUL	8.0	22	31	82	40	54	38
MAY-SEP	19.0	32	41	84	50	63	49
YELLOWSTONE RIVER at Billings							
MAY-JUL	2000	2450	2750	83	3050	3500	3320
MAY-SEP	2490	2970	3300	83	3630	4110	3954

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

UPPER YELLOWSTONE RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********** This Year	Last Year	Average
MYSTIC LAKE	21.0	0.2	1.2	1.9
COONEY	27.4	25.2	23.3	19.4

UPPER YELLOWSTONE RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
YELLOWSTONE ab LIVINGSTON	15	159	100
SHIELDS	4	156	112
BOULDER-STILLWATER	4	150	102
CLARK'S FORK-ROCK CREEK	12	122	87
UPPER YELLOWSTONE above BIGH	31	150	98

LOWER YELLOWSTONE RIVER BASIN as of May 1, 1993

Snowpack conditions in the Lower Yellowstone River Basin are average, increasing 19 percent from April 1, and are 63 percent above last year. Snow water content was 92 percent of average and 163 percent of last year. Refer to the watershed snowpack analysis that follows for individual watershed percent of average and percent of last year figures.

Mountain precipitation for April was above average at 125 percent and 10 percent above last April. Water year precipitation, beginning October 1, 1992, is average at 90 percent and 1 percent below last year.

Reservoir storage on the last day of April was 99 percent of average and 2 percent below last year. Bighorn Lake storage was 101 percent of average and the same as last year and the Tongue River storage was 99 percent of average and 30 percent below last year.

Streamflows are forecast to be below average at 83 percent and 1 percent below last year. Provisional April streamflow data for the Bighorn River near Saint Xavier was near average and around 10 to 15 percent above last year.

Surface Water Supply Index (SWSI) rating for the Yellowstone River below Bighorn River was -1.0; the Bighorn River below Bighorn Lake was -0.5; the Little Bighorn River was -2.1; the Tongue River was -2.0; and the Powder River was -1.2.

LOWER YELLOWSTONE RIVER BASIN
Streamflow Forecasts - May 1, 1993

	<=== Drier ===	Future Conditions	=== Wetter ===>		
Forecast Pt	Chance of Exceeding *				
Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
YELLOWSTONE RIVER at Billings							
MAY-JUL	2000	2450	2750	83	3050	3500	3320
MAY-SEP	2490	2970	3300	83	3630	4110	3954
BIG HORN RIVER nr St. Xavier (2)							
MAY-JUL	830	1130	1340	89	1550	1850	1508
MAY-SEP	1000	1270	1490	89	1710	2030	1673
LITTLE BIGHORN RIVER nr Hardin							
MAY-JUL	47	66	97	82	128	150	118
MAY-SEP	54	75	109	81	143	171	135
TONGUE RIVER near Decker (2)							
MAY-JUL	77	136	175	86	215	275	204
MAY-SEP	91	153	195	86	235	300	227
YELLOWSTONE at Miles City (2)							
MAY-JUL	3170	3570	4140	84	4710	5210	4957
MAY-SEP	3730	3730	4900	84	5500	6130	5835
POWDER RIVER at Moorhead							
MAY-JUL	64	96	150	82	205	320	183
MAY-SEP	71	114	170	83	225	355	204

Forecast Pt / Forecast Period	<=== Drier === 90% (1000AF)	70% (1000AF)	Future Conditions 50% (Most Prob) (1000AF)	(% AVG.)	=== Wetter ===> 30% (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)
	Chance of Exceeding *						
POWDER RIVER near Locate							
MAY-JUL	65	121	186	88	250	380	211
MAY-SEP	73	141	210	90	280	425	234
YELLOWSTONE RIVER nr Sidney (2)							
MAY-JUL	3200	3670	4320	84	4970	5670	5153
MAY-SEP	3710	3810	5030	84	6250	6590	5988

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

LOWER YELLOWSTONE RIVER BASIN
Reservoir Storage (1000AF) End of April

Reservoir	Usable Capacity	********** Usable Storage ********* This Year	Last Year	Average
BIGHORN LAKE	1356.0	800.2	804.7	789.2
TONGUE RIVER	68.0	19.1	27.4	36.6

LOWER YELLOWSTONE RIVER BASIN
Watershed Snowpack Analysis - May 1, 1993

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
WIND RIVER (Wyoming)	17	331	94
BIGHORN RIVER (Wyoming)	21	139	93
LITTLE BIGHORN	3	106	83
TONGUE RIVER (Wyoming)	9	116	87
POWDER RIVER (Wyoming)	9	156	96
YELLOWSTONE RIVER	74	157	95

Basin Outlook Reports
and
Federal - State - Private
Cooperative Snow Surveys

For more water supply and resource management information, contact:

See attached list.

How forecasts are made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated SNOTEL measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and the additional forecasts will move closer to the most probable forecast.

All programs and services of the USDA Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

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Soil Conservation Service
Bozeman, Montana

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538-7401

Phillips County
Allen McNeal
654-1334

(over)

Pondera County
Phyllis Philipps
278-3922

Powder River County
Carol Hilliard
436-2417

Powell County
Glen Green
846-1703

Prairie County
Mark Parman
637-5381

Ravalli County
Keith Robertson
363-5010

Richland County
Kim Whipple
482-2110

Roosevelt County
Richard Iversen
787-5232

Rosebud County
Rocklin Schwagler
356-7626

Sanders County
Timothy Julander
826-3701

Sheridan County
Monica Friedrich
765-1801

Silver Bow County
Robert Leinard
287-3215

Stillwater County
Philip Sandoval
322-5359

Sweet Grass County
Charles Roloff
932-5160

Teton County
Chris Murphy
466-5722

Toole County
David Pratt
434-5835

Treasure County
Rocklin Schwagler
356-7626

Valley County
Lanny Walker
228-4324

Wheatland County
John Oiestad
632-5534

Wibaux County
Rick Caquelin
778-2217

Yellowstone County
Harold Cottet Jr.
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Montana
Basin Outlook Report

Soil Conservation Service
Bozeman, MT

SOIL CONSERVATION SERVICE